

CLAIMS

What is claimed is:

1. A fuel injector for a gas turbine combustor, comprising:
5 a first annular premix fuel manifold adapted to be disposed upstream of the combustor; and
an annular member concentric with the first premix fuel manifold and defining a first venturi shaped air/fuel pre-mix volume between the first premix fuel manifold and the annular member, the first pre-mix volume having a
10 throat, the first premix fuel manifold including a plurality of pores associated with the throat;
and wherein fuel is to be injected from the first premix fuel manifold for mixing with air in the first pre-mix volume.
- 15 2. The injector according to Claim 1, wherein the annular member further comprises an outer wall disposed to enclose the first manifold and adapted to be coupled to the combustor.
3. The injector according to Claim 1, wherein the annular
20 member further comprises a second premix fuel manifold.
4. The injector according to Claim 1, further comprising a sheet extending downstream from the first premix fuel manifold; and wherein the first pre-mix volume extends downstream from the first premix fuel manifold.
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5. The injector according to Claim 4, wherein the injector comprises a premix injector about 2 inches (50.4 mm) long.
6. The injector according to Claim 1, further comprising a pilot
30 injector disposed downstream from the first premix fuel manifold.

7. The injector according to Claim 6, wherein the pilot injector comprises one of a fanformer, a splash plate, and an impinging doublet type fuel injector.

5 8. The injector according to Claim 1, wherein the plurality of pores comprise holes having diameters between about 0.002 and about 0.004 inches (0.508 mm – 0.1016 mm).

10 9. The injector according to Claim 1 further comprising the first pre-mix volume extending downstream from the throat and having a width downstream of the throat less than about a quench distance of the fuel.

10. A gas turbine combustor, comprising:

a combustion chamber;

a first annular premix fuel manifold disposed upstream of the combustion chamber; and

5 an annular member concentric with the first premix fuel manifold and defining a first venturi shaped air/fuel pre-mix volume between the first premix fuel manifold and the annular member, the first pre-mix volume having a throat, the first premix fuel manifold including a plurality of pores approximately upstream of the throat; and wherein fuel is to be injected from the first premix fuel
10 manifold for mixing with air in the first pre-mix volume.

11. The combustor according to Claim 10, wherein the annular member further comprises an outer wall of the injector disposed to enclose the first premix manifold and adapted to be coupled to the combustor.

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12. The combustor according to Claim 10, wherein the annular member further comprises a second premix fuel manifold.

13. The combustor according to Claim 12, further comprising a
20 first and a second premix fuel supply in communication with the first and the second premix fuel manifolds respectively.

14. The combustor according to Claim 10, further comprising a sheet extending downstream from the first premix fuel manifold whereby the first
25 pre-mix volume extends downstream from the first premix fuel manifold.

15. The combustor according to Claim 14, wherein the injector is about 2 inches long (50.4 mm).

16. The combustor according to Claim 10, further comprising a
30 pilot injector disposed downstream from the first premix fuel manifold.

17. The combustor according to Claim 16, wherein the pilot injector comprises one of a fanformer, a splash plate, and an impinging doublet type fuel injector.

5 18. The combustor according to Claim 10, wherein the plurality of pores comprise holes having diameters between about 0.002 and about 0.004 inches (0.0508 mm – 0.1016 mm).

10 19. The combustor according to Claim 10, further comprising the first pre-mix volume extending downstream from the throat and having a width downstream of the throat less than about a quench distance of the fuel.

20. A method of pre-mixing air and fuel for a gas turbine combustor, comprising:

5 defining a first venturi shaped pre-mix volume between a first annular premix fuel manifold and an annular member, the first pre-mix volume having a throat; and
injecting fuel from the first premix fuel manifold through a plurality of pores in the first premix fuel manifold approximately upstream of the throat; and
mixing the fuel with air in the pre-mix volume.

10 21. The method according to Claim 20, further comprising using the annular member as an outer wall to enclose the first premix fuel manifold.

22. The method according to Claim 20, using the annular member further as a second premix fuel manifold.
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23. The method according to Claim 22, further comprising placing a first and a second premix fuel supply in communication with the first and the second premix fuel manifolds respectively.

20 24. The method according to Claim 20, further comprising extending a sheet downstream from the first premix fuel manifold and less than about a quench distance of the fuel from the annular member thereby extending the first pre-mix volume downstream from the first premix fuel manifold.

25 25. The method according to Claim 24, wherein the injector is about 2 inches (50.4 mm) long.

26. The method according to Claim 20, further comprising disposing a pilot injector downstream from the first premix fuel manifold.
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27. The method according to Claim 26, wherein the pilot injector comprising one of a fanformer, a splash plate, or an impinging doublet type fuel injector.

28. The method according to Claim 20, wherein the plurality of pores comprise holes having diameters between about 0.002 and about 0.004 inches (0.0508 mm – 0.1016 mm).

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